MITSUBISHI

Ethernet Interface Module

User's Manual

(Hardware)

QJ71E71-100
QJ71E71-B5
QJ71E71-B2

Thank you for purchasing the Mitsubishi programmable controller MELSEC-Q Series.

Prior to use, please read both this and relevant manual thoroughly to fully understand the product.

MELSEC-Q
Mitsubishi Programmable Controller

MODEL	QJ71E71-U-HW-JE
MODEL CODE	13JQ35
IB(NA)-0800009-I(1004)MEE	

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● SAFETY PRECAUTIONS ●

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.
Note that these precautions apply only to this product. For the safety instructions of the programmable controller system, please read the user's manual of the CPU module to use.
In this manual, the safety precautions are classified into two levels:
"⚠WARNING" and "⚠CAUTION".

⚠WARNING	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "⚠CAUTION" may lead to serious consequences.
Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Design Precautions]

⚠CAUTION

- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other.
  They should be installed 100 mm (3.94 inch) or more from each other.
  Not doing so could result in noise that would cause erroneous operation.

[Installation Precautions]

⚠CAUTION

- Use the programmable controller in the operating environment that meets the general specifications described in the user's manual of the CPU Module to use.
  Using this programmable controller in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.

[Installation Precautions]

⚠CAUTION

- While pressing the installation lever located at the bottom of module, insert the module fixing tab into the fixing hole in the base unit until it stops. Then, securely mount the module with the fixing hole as a supporting point.
  Incorrect loading of the module can cause a malfunction, failure or drop.
  When using the programmable controller in the environment of much vibration, tighten the module with a screw.
- Tighten the screw in the specified torque range.
  Undertightening can cause a drop, short circuit or malfunction.
  Overtightening can cause a drop, short circuit or malfunction due to damage to the screw or module.
- Completely turn off the externally supplied power used in the system before mounting or removing the module. Not doing so could result in damage to the product.
- Do not directly touch the module's conductive parts or electronic components.
  Touching the conductive parts could cause an operation failure or give damage to the module.

[Wiring Instructions]

⚠CAUTION

- Use crimp-contact, pressure-displacement or soldering to wire the connectors for external connections properly using the manufacturer-specified tools.
  Imperfect connections could result in short circuit, fires, or erroneous operation.
- Shut off the external power supply for the system in all phases before connecting the AUI cable.
- When connecting a cable with connector to the module, connect the connector part to the module securely.
- Make sure to place the communication and power cables to be connected to the module in a duct or fasten them using a clamp.
  If the cables are not placed in a duct or fastened with a clamp, their positions may be unstable or moved, and they may be pulled inadvertently. This may damage the module and the cables or cause the module to malfunction because of faulty cable connections.
- Tighten the terminal screws with the specified torque.
  If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation.
  Tightening the terminal screws too far may cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.

[Wiring Instructions]

⚠CAUTION

- When disconnecting the communication and power cables from the module, do not pull the cables by hand. When disconnecting a cable with a connector, hold the connector to the module by hand and pull it out to remove the cable. When disconnecting a cable connected to a terminal block, loosen the screws on the terminal block first before removing the cable. If a cable is pulled while being connected to the module, it may cause the module to malfunction or damage the module and the cable.
- Be sure there are no foreign substances such as sawdust or wiring debris inside the module.
  Such debris could cause fires, damage, or erroneous operation.
- The module has an ingress prevention label on its top to prevent foreign matter, such as wire offcuts, from entering the module during wiring.
  Do not peel this label during wiring.
  Before starting system operation, be sure to peel this label because of heat dissipation.
- Solder the coaxial cable connectors properly. Incomplete soldering may result in malfunctions.

● CONDITIONS OF USE FOR THE PRODUCT ●

(1) Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions;
i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;
- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

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Revisions

∗The manual number is given on the bottom right of the cover.

Print Date	∗Manual Number	Revision
Sep., 1999	IB(NA)-0800009-A	First printing
Dec., 1999	IB(NA)-0800009-B	Addition "Compliance with the EMC Directive and the Low Voltage Directive" Correction Chapter 2, Section 5.2 POINT
Sep., 2000	IB(NA)-0800009-C	Put Windows® base software products together from Mitsubishi Programmable Logic Controller MELSEC series to Mitsubishi integrated FA software MELSOFT series. Standardize the name from software package (GPP function) to Product name (GX Developer.) Correction "SAFETY PRECAUTIONS", "Manuals", "Compliance with the EMC Directive and the Low Voltage Directive", Chapter 1, Chapter 2, Chapter 6, Chapter 7.
May, 2001	IB(NA)-0800009-D	Additional model QJ71E71-100
Sep., 2001	IB(NA)-0800009-E	Correction Chapter 2, Chapter 3, Chapter 4, Section 5.1 POINT, Section 5.2 POINT, Chapter 6
Apr., 2003	IB(NA)-0800009-F	Additional model QJ71E71-B5 Deleted model QJ71E71
Mar., 2006	IB(NA)-0800009-G	Correction "SAFETY PRECAUTIONS", "Compliance with the EMC and Low Voltage Directives", Section 3.1, Chapter 7
Sep., 2008	IB(NA)-0800009-H	Correction "SAFETY PRECAUTIONS", "Compliance with the EMC and Low Voltage Directives", Section 3.1, Chapter 4, Section 5.2, Chapter 7
Apr., 2010	IB(NA)-0800009-I	Addition "CONDITIONS OF USE FOR THE PRODUCT" Correction "SAFETY PRECAUTIONS", Chapter 4, Section 5.2, Chapter 7

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About Manuals

The following table lists manuals regarding this product.
Use this table to order necessary manuals respective to the functions used.

Related Manuals

Manual name	Manual No. (Model code)
Q Corresponding Ethernet Interface Module User's Manual (Basic)	SH-080009 (13JL88)
Q Corresponding Ethernet Interface Module User's Manual (Application)	SH-080010 (13JL89)
Q Corresponding Ethernet Interface Module User's Manual (Web function)	SH-080180 (13JR40)
MELSEC-Q/L MELSEC Communication Protocol Reference Manual	SH-080008 (13JF89)

Please read the Q Corresponding Ethernet Interface Module User's Manual (Basic) before using this module.

Compliance with the EMC and Low Voltage Directives

(1) For programmable controller system

To configure a system meeting the requirements of the EMC and Low Voltage Directives when incorporating the Mitsubishi programmable controller (EMC and Low Voltage Directives compliant) into other machinery or equipment, refer to Chapter 9 "EMC AND LOW VOLTAGE DIRECTIVES" of the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

The CE mark, indicating compliance with the EMC and Low Voltage Directives, is printed on the rating plate of the programmable controller.

(2) For the product

For the compliance of this product with the EMC and Low Voltage Directives, refer to Section 9.1.3 "Cables" in Chapter 9 "EMC AND LOW VOLTAGE DIRECTIVES" of the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

1. Overview

This manual describes how to install the QJ71E71-100/QJ71E71-B5/QJ71E71-B2 Ethernet interface modules (hereinafter referred to as Ethernet modules) and how to wire them with external devices.

(Product Configuration)

Model	Item name	Quantity
QJ71E71-100	QJ71E71-100 Ethernet interface module	1
QJ71E71-B5	QJ71E71-B5 Ethernet interface module	1
QJ71E71-B2	QJ71E71-B2 Ethernet interface module	1

2. Performance Specifications

The following describes the performance specifications of the Ethernet module. For the general specifications of the Ethernet module, refer to the user's manual for the CPU module used.

<table>
<tr><td colspan="3" rowspan="3">Item</td><td colspan="2">Specification</td></tr>
<tr><td colspan="2">QJ71E71-100</td></tr>
<tr><td>100BASE-TX</td><td>10BASE-T</td></tr>
<tr><td rowspan="6">Trans-mission specifi-cations</td><td colspan="2">Data transmission speed</td><td>100 Mbps (Full-duplex/Half-duplex)</td><td>10 Mbps (Half-duplex)</td></tr>
<tr><td colspan="2">Transmission method</td><td colspan="2">Base band</td></tr>
<tr><td colspan="2">Maximum node-to-node distance</td><td colspan="2">—</td></tr>
<tr><td colspan="2">Maximum segment length</td><td colspan="2">100 m (328.08 ft.) (∗1)</td></tr>
<tr><td colspan="2">Maximum number of nodes/connection</td><td>Cascade connection
Maximum 2 stages</td><td>Cascade connection
Maximum 4 stages</td></tr>
<tr><td colspan="2">Interval between the minimum nodes</td><td colspan="2">—</td></tr>
<tr><td rowspan="4">Trans-mission data storage memory</td><td colspan="2">Number of simultaneously open connections allowed</td><td colspan="2">16 connections (Connections usable by the sequence program)</td></tr>
<tr><td colspan="2">Fixed buffer</td><td colspan="2">1 k words × 16</td></tr>
<tr><td colspan="2">Random access buffer</td><td colspan="2">6 k words × 1</td></tr>
<tr><td rowspan="2">E-mail</td><td>Attached file</td><td colspan="2">6 k words × 1 (∗2)</td></tr>
<tr><td>Main text</td><td colspan="2">960 words × 1 (∗2)</td></tr>
<tr><td colspan="3">Number of I/O points occupied</td><td colspan="2">32 points/1 slot (I/O assignments: intelligent)</td></tr>
<tr><td colspan="3">5 V DC internal current consumption</td><td colspan="2">0.50 A</td></tr>
<tr><td colspan="3">12 V DC external power supply capacity (Transceiver)</td><td colspan="2">—</td></tr>
<tr><td colspan="3">External dimensions</td><td colspan="2">98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) × 90 (3.54 in.) (D) [mm]</td></tr>
<tr><td colspan="3">Weight</td><td colspan="2">0.11 kg (0.24 lb.)</td></tr>
</table>

Item			Specification	
			QJ71E71-B5	QJ71E71-B2
			10BASE5	10BASE2
Trans-mission specifi-cations	Data transmission speed		10 Mbps (Half-duplex)	
	Transmission method		Base band	
	Maximum node-to-node distance		2500 m (8202.10 ft.)	925 m (3034.77 ft.)
	Maximum segment length		500 m (1640.42 ft.)	185 m (606.96 ft.)
	Maximum number of nodes/connection		100 units/ segment	30 units/ segment
	Interval between the minimum nodes		2.5 m (8.20 ft.)	0.5 m (1.64 ft.)
Trans-mission data storage memory	Number of simultaneously open connections allowed		16 connections (Connections usable by the sequence program)	
	Fixed buffer		1 k words × 16	
	Random access buffer		6 k words × 1	
	E-mail	Attached file	6 k words × 1 (∗2)	
		Main text	960 words × 1 (∗2)	
Number of I/O points occupied			32 points/1 slot (I/O assignments: intelligent)	
5 V DC internal current consumption			0.50 A	0.60 A (∗4)
12 V DC external power supply capacity (Transceiver)			(∗3)	—
External dimensions			98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) × 90 (3.54 in.) (D) [mm]	
Weight			0.12 kg (0.26 lb.)	0.13 kg (0.29 lb.) (∗4)

∗1: Length between the Hub and node.

∗2: Regarding the specifications of the e-mail transmission and reception function, refer to the Ethernet module Users Manual (Basic) or the Users Manual (Application).

∗3: It is necessary to apply a transceiver, or a device that meets AUI cable specifications.

∗4: The product with first 5 digits of serial number "05049" or earlier is different as follows:

- 5V DC internal current consumption: 0.70A
- Weight: 0.14kg (0.31lb.)

3. Loading and Installation

3.1 Handling Precautions

(1) Do not drop or apply severe shock to the module case since it is made of resin.

(2) Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the module.
Failure to do so may cause a failure or malfunctions of the module.

(3) Tighten the screws such as module fixing screws within the following range.

Screw location	Tightening torque range
External power supply terminal screw (M2.5 screw) (∗1)	0.40 N•m
Module fixing screw (usually not required) (M3 screw) (∗2)	0.36 to 0.48 N•m

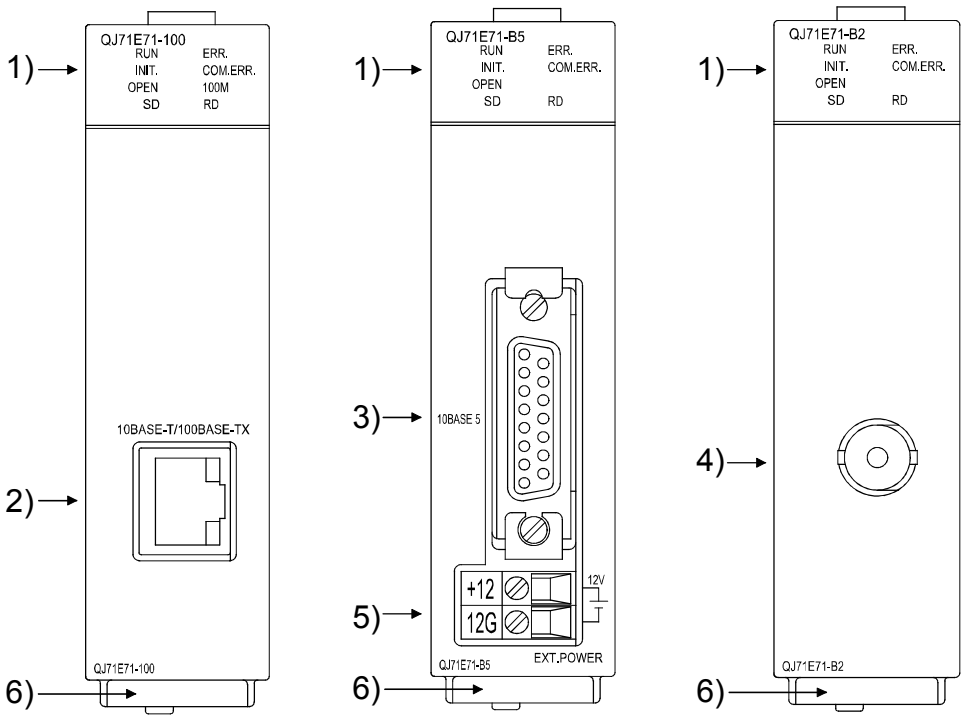
∗1: This terminal is used as an external power input terminal for supplying power to the transceiver when being connected to a 10BASE5.

∗2: The module can be easily fixed onto the base unit using the hook at the top of the module. However, it is recommended to secure the module with the module fixing screw if the module is subject to significant vibration.

3.2 Installation Environment

For further details, refer to the user's manual for the CPU module to use.

4. Part Names

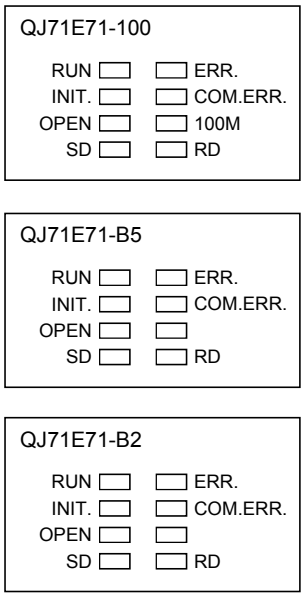


	Name		Name
1)	LED display (Refer to 1))	5)	External power supply terminal (Transceiver power supply) (Input power supply reference value: 13.28 V to 15.75 V)
2)	10BASE-T/100BASE-TX connector (RJ45) (∗1)		
3)	10BASE5 connector	6)	Serial number plate (∗2)
4)	10BASE2 connector		

∗1: The orientation of the connector is different (rotated) depending on the serial No. Although an LED may be built in the connector depending on the serial No. of the module, it will not turn on.

∗2: Indicates the serial No. of the Ethernet module.

(1) LED display contents



LED display	Display contents: (○:Off ● : On)
RUN	● : Normal operation ○ : Abnormal operation
INIT.	● : Initial processing normal completion ○ : Initial processing not performed
OPEN	● : Normally opened connection available (∗1) ○ : Normally opened connection not available
SD	● : Data being sent ○ : Data is not sent
ERR.	● : Setting abnormal display (∗2) ○ : Normal setting display
COM.ERR.	● : Communication abnormal display ○ : Normal communication display
100 M	● : 100 M bps ○ : 10 M bps/When not connected
RD	● : Data being received ○ : Data not received

∗1: The [OPEN] LED turns on/off depending on the open states of user connections 1 to 16.

∗2: The [ERR.] LED turns on in the following cases:

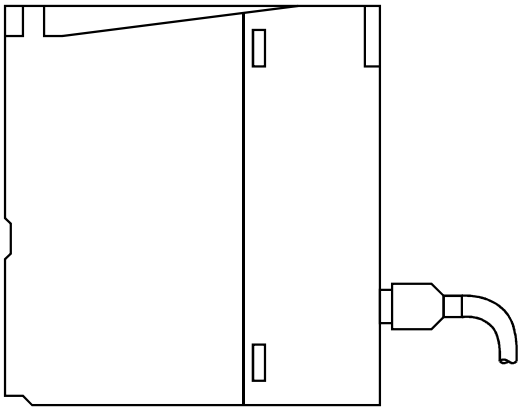
- When setting values in GX Developer (mode, station number, and/or network number) are incorrect.
- When an error has occurred in the Ethernet module or programmable controller CPU and the operation is disabled due to the error.

5. Connecting to the Network

The following describes how to connect the Ethernet module to the 100BASE-TX, 10BASE-T, 10BASE5 and 10BASE2.

POINT
Sufficient safety precautions are required when installing the 100BASE-TX, 10BASE-T, 10BASE5 and 10BASE2 networks. Consult a specialist when connecting cable terminals or installing trunk line cables, etc.

5.1 Connecting to the 10BASE-T/100BASE-TX



<Connection procedure>

1) Connect the twisted pair cable to the hub.
2) Connect the twisted pair cable to the Ethernet module.

POINT

During the high-speed communication (100 M bps) via 100BASE-TX connection, a communication error may occur due to the effect of high frequency noise from devices other than programmable controller in a given installation environment.

The following describes countermeasures on the QJ71E71-100 side to prevent the effect of high frequency noise for construction of network system.

(1) Wiring connection

- Do not bundle the twisted pair cables with the main circuit and the power wires, and do not install them close to each other.
- Make sure to place the twisted pair cables in a duct.

(2) Communication method

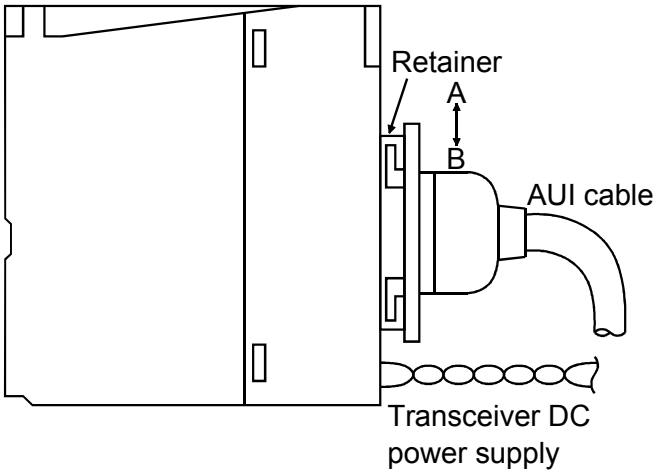
- Data communication with an external device is performed using TCP/IP communication.
- Increase the number of communication retries as necessary.

(3) 10 M bps communication

- Communication is performed at a data transmission rate of 10 M bps by changing the connection hub for the QJ71E71-100 to a hub capable of handling 10 M bps.

5.2 Connecting to the 10BASE5

(1) Connecting an AUI cable



<Connection procedure> (∗1)

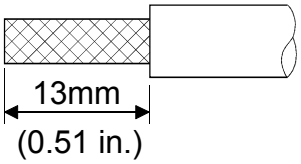
1) Slide the retainer toward the direction B as shown in the figure.
2) Push in the AUI cable connector all the way.
3) Slide the retainer toward the direction A as shown in the figure.
4) Confirm that the AUI cable is locked.

∗1: Do not connect the AUI cable while the power to the module installed station is on.

(2) Wiring to the external power supply terminal (DC power supply for transceiver (∗1))

The following explains how to connect a cable to the external power supply terminal (DC power supply for transceiver).

1) Strip the cable jacket back 13mm. (∗2)
   The applicable cable size is 0.13mm^2 (AWG26) to 2.5mm^2 (AWG14).



2) Loosen the terminal screw and insert the cable into the terminal.
3) Tighten the terminal screw within the torque range shown in Section 3.1.

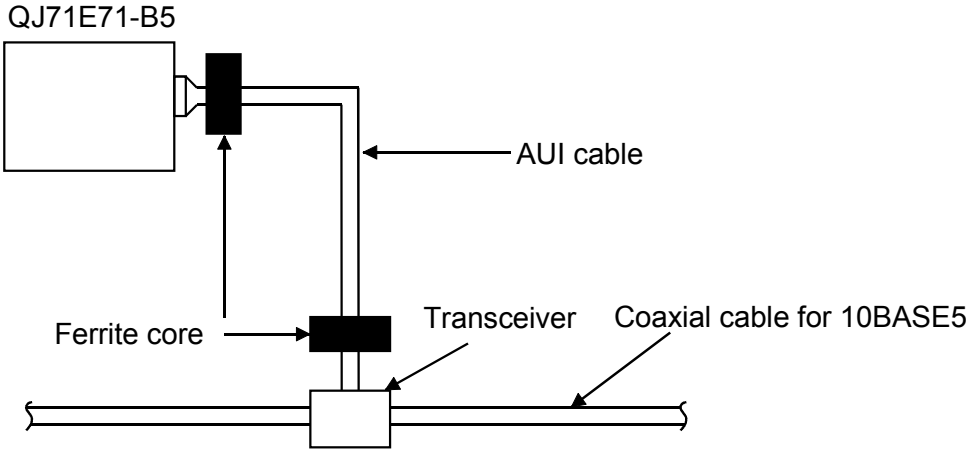
∗1:Use a transceiver with a function that is generally called SQE TEST or heart beat (a transceiver function that emits signals to notify whether the transceiver is operating normally at the end of communication).

∗2:If the wire strip length is too long, the conductive part is exposed and it may increase the risk of electric shock or short circuit between the adjacent terminals. If the wire strip length is too short, it may result in poor contact.

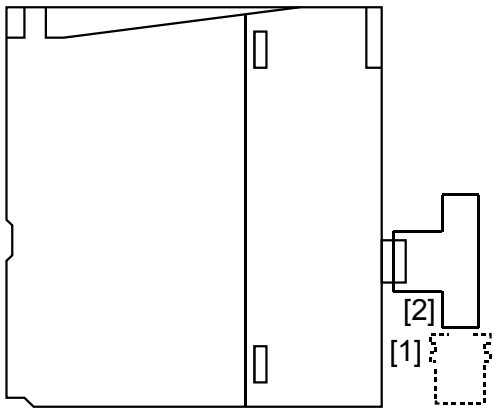
POINT

(1) The following can be used as a countermeasure for errors due to high frequency noise according to the installation environment.
 ∗ Mount a ferrite core using the method shown in (2) below.
 ∗ Increase the retry number when communicating by TCP/IP.

(2) Use the following method to mount a ferrite core when connected to the network by 10BASE5.
 (Mounting the ferrite core)
 Mount the ferrite core to the Ethernet module side and the external device side/the transceiver side for AUI cable.
 (The ferrite core used for our testing: ZCAT 2032-0930 manufactured by TDK Corporation)



5.3 Connecting to the 10BASE2



<Connection procedure>

1) Push in the connector by aligning the groove [1] and tab [2] as shown in the figure.
2) While pushing in the connector, rotate it clockwise by a 1/4 turn.
3) Turn until the connector locks.
4) Check that the connector is locked.

6. Setting from GX Developer

Using GX Developer, please make parameter setting for "Network Parameters Setting the number of Ethernet/CC IE/MELSECNET cards" (∗1) and "Ethernet Operations".

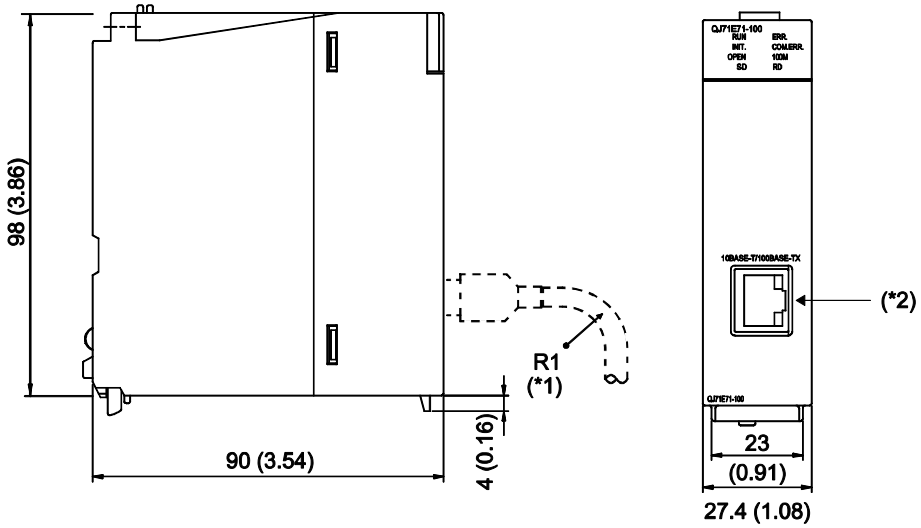
Item	Contents
Network parameters setting the number of Ethernet/CC IE/MELSECNET cards	Sets "Staring I/O No.", "Network No." and "Station No." to use Ethernet module as Network module.
Ethernet operations	Sets "Communication data code", "IP address" and "Initial timing" to perform initial processing of Ethernet module.

Remarks

It is not necessary to set the "Intelligent function module switch settings" with GX Developer's I/O assignment.
Each type of setting corresponding to the switch settings is performed in the above mentioned "Operational settings," "Initial settings," and "Open settings."

7. External Dimensions

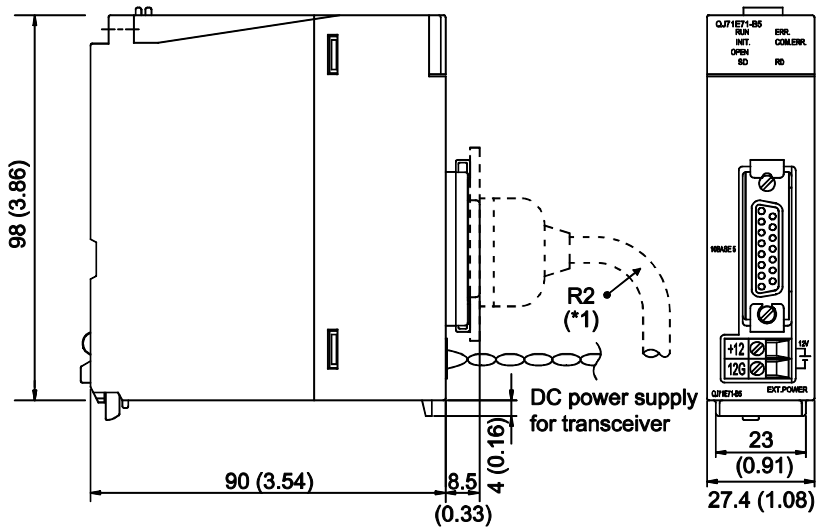
(1) QJ71E71-100



(Units : mm (in.))

∗1: When connecting the twisted pair cable, set the bending radius near the connector (reference value: R1) as four times the cable's outside diameter or larger.
∗2: The orientation of the connector is different (rotated) depending on the serial No.

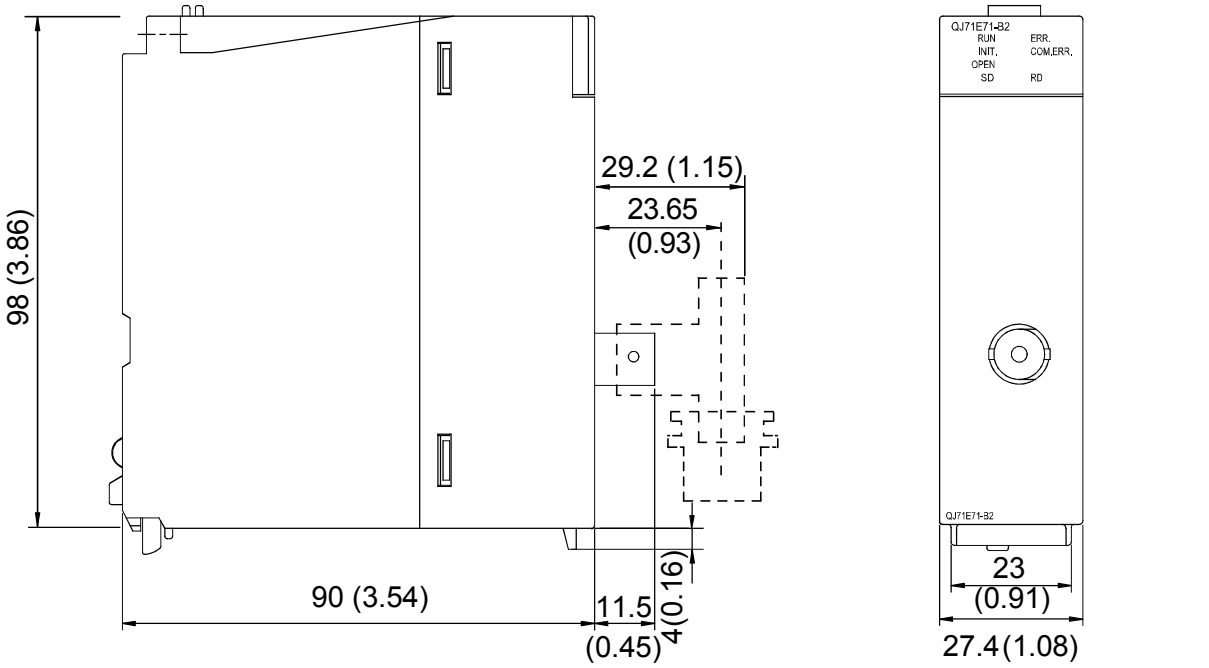
(2) QJ71E71-B5



(Units : mm (in.))

∗1: When connecting the AUI cable, set the bending radius near the connector (reference value: R2) as four times the cable's outside diameter or larger.

(3) QJ71E71-B2



(Units : mm (in.))

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MEMO

Warranty

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